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Richard L. Marks

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EXAMINER

WANG, KENT F

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/758,817	<b>Applicant(s)</b> MARKS, RICHARD L.	
	<b>Examiner</b> KENT WANG	<b>Art Unit</b> 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 January 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4,6-11,13-15 and 17-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4,6-11,13-15 and 17-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/28/2008 has been entered.

### ***Response to Amendment***

2. The amendments, filed on 01/28/2008, have been entered and made of record. Claims 1-4, 6-11, 13-15, and 17-32 are pending.

### ***Response to Arguments***

3. Applicant's arguments with respect to claims 1-4, 6-11, 13-15, and 17-32 have been considered but are moot in view of the new ground(s) or rejection.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1 and 3-32 are under 35 U.S.C. § 103(a) as being unpatentable over Gvili, “Depth Keying” SPIE Vol. 5006 (2003) in view of Parker, US 7,106,366.

Regarding claim 1, Gvili discloses a method for differentiating between foreground objects and background objects within a scene being captured through an image capture device (a novel depth video camera), comprising:

- emitting a ray of light from a light source toward an object of the scene (generating a light wall, Para 3.1, pp 566-567);
- opening an aperture cover allowing access to a sensor of the image capture device for reflected light from the light source (deploying a fast image shutter in front of the CCD chip, page 567, lines 3-4);
- closing the aperture cover after a set time (the shutter is precisely controlling the exposure time of the CCD, page 567, lines 17-18), the predefined amount of time corresponding to a maximum distance traveled by the light (a real-time trimap is generated for each frame based on the original depth matte, page 569, lines 22-23);
- generating a depth mask identifying objects within a foreground region and a background region of the scene (foreground objects can be generated by setting the depth measurement window, page 568, section 3.2) based upon the light captured during the set time (a real-time trimap is generated for each frame based on original depth matte, page 569, 4th paragraph), the depth mask identifying objects within the foreground region with a first bit value (full value pixels

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- representing foreground pixels in the color channel) and identifying objects within the background region with a second bit value (zero value pixel representing background) (page 564, 6<sup>th</sup> paragraph); and
- adjusting image capture device parameters according to bit values of the depth mask prior to capturing a subsequent corresponding image of the scene (normalized depth of pixel  $D(i,j)$  can be calculated, page 567, lines 7-11) wherein the image capture device parameters are selected from one of focus (zoomed, page 568 line 2), brightness (collected light by each pixel, page 567, line 5), exposure (exposure time, page 567, line 18) or gain (normalized depth of pixel, page 567, line 8).

Gvili does not specifically teach that the adjusting of the image capture device parameters being done independently in the foreground from the background.

However Parker does teach the adjusting of the image capture device parameters (digital image data outputs from sensor signal processing operation 204 for calculation of belief map 209, Fig 3) being done independently in the foreground from the background (main subject detection unit 208 has a number of subtasks including region segmentation, perceptual grouping, feature extraction, and probabilistic reasoning for the subjects in the foreground) (col. 5, lines 14-67 and Figs 2a, 2b, 2c, and 3).

Thus, it would have been obvious to one of ordinary skill in the art to have included a main subject detection unit as taught by Parker into Gvili's digital camera, as the Parker reference suggested there may be other information relating to the

importance of the photographed subject and corresponding background regions that can be used by the main subject detection unit to refine the belief map (col. 8, lines 20-34, Parker).

Regarding claim 3, Gvili discloses the light source is configured to emit infrared light (IR laser diodes, page 567, lines 15-16).

Regarding claim 4, Gvili discloses a method operation of opening an aperture cover allowing access to a sensor of the image capture device (the shutter is precisely controlling the exposure time of the CCD, page 567, lines 17-18) includes, receiving reflected light from the objects within the foreground region (light reflected from every object inside the depth measurement window, page 568, second paragraph of section 3.2).

Regarding claim 6, Gvili discloses a method operation of adjusting image capture device parameters according to bit values of the depth mask prior to capturing a subsequent corresponding image of the scene (ability to change the parameters of the depth window according to the scenario's need, page 568, section 3.2, first paragraph) includes, determining an optimal amount of light based upon the depth mask; and adjusting the aperture cover to allow the optimal amount of light into the image capture device (normalized depth of pixel can be calculated, page 567, lines 7-11).

Regarding claim 7, Gvili discloses the image capture device parameters are adjusted through mechanical adjustments (depth key setting can be automatically set, page 568, third paragraph of section 3.2).

Regarding claim 8, this claim recites same limitations as claim 3. Thus it is analyzed and rejected as previously discussed with respect to claim 3 above.

Regarding claim 9, Gvili discloses a method for adjusting image capture settings for a single image capture device (a novel depth video camera), comprising:

- identifying a scene (easily identified, page 569, third paragraph);
- capturing an image of the scene through the single image capture device (the depth information is captured by a camera, page 566, fifth paragraph);
- generating a depth mask of the scene from data defining the image of the scene (generating depth map according to some depth criterion, page 568, last paragraph); and
- adjusting pixel values of the data defining the image corresponding to objects within any one or both of a foreground region and a background region of the captured image (normalized depth of pixel  $D(i,j)$  can be calculated, page 567, lines 7-11), and the adjusting of pixel values is according to bit values of the depth mask (full value pixels representing foreground pixels in the color channel and zero value pixel representing background) (page 564, 6<sup>th</sup> paragraph).

Gvili does not specifically teach that adjusting pixel values associated with the foreground region are independent of adjusting of pixel values associated with the background region.

However Parker does teach adjusting pixel values associated with the foreground region are independent of adjusting of pixel values associated with the background region (main subject detection unit 208 can adjusting pixel values associated with the foreground region independently because 208 has a number of subtasks including region segmentation, perceptual grouping, feature extraction, and probabilistic reasoning for the subjects in the foreground only) (col. 5, lines 14-67 and Figs 2a, 2b, 2c, and 3).

Thus, it would have been obvious to one of ordinary skill in the art to have included a main subject detection unit as taught by Parker into Gvili's digital camera, as the Parker reference suggested there may be other information relating to the importance of the photographed subject and corresponding background regions that can be used by the main subject detection unit to refine the belief map (col. 8, lines 20-34, Parker).

Regarding claim 10, Gvili discloses the method operation of generating a depth mask of the scene from data defining the image of the scene includes segmenting the foreground and background regions of the scene (automatically segmentation of the scene is possible, page 568, third paragraph of section 3.2).

Regarding claim 11, Gvili discloses the data defining the image of the scene includes pixel data where each pixel is tagged with distance information (calculate color distances between neighboring pixels, page 570, section d).

Regarding claim 13, Gvili discloses the image capture device is selected from the group consisting of a digital camera, a web cam, and a camcorder (a novel depth video camera, page 564, line 4).



Regarding claim 14, Gvili discloses the displaying a portion of the image of the scene having adjusted pixel values (a new matte is generated by combining the information from both the depth and the color frames, page 569, fourth paragraph and also page 571, first paragraph of section 4).

Regarding claim 15, Gvili discloses the portion of the image of the scene is an image of a participant for use in an interactive gaming application (man-machine interactions, page 572, second paragraph of section 5).

Regarding claim 17, this claim differs from claim 9 only in that the claim 9 is a method claim whereas claim 17 is an apparatus. Thus the apparatus claim 17 is analyzed and rejected as previously discussed with respect to claim 9 above.

Regarding claim 18, Gvili discloses the depth mask is a bit mask having a first logical value (full value pixels) assigned to represent the foreground objects and a second logical value (zero value pixels) assigned to represent the background objects (full value pixels representing foreground pixels in the color channel and zero value pixel representing background) (page 564, 6<sup>th</sup> paragraph).

Regarding claims 19, this claim recites same limitations as claim 4. Thus it is analyzed and rejected as previously discussed with respect to claim 4 above.

Regarding claim 20, Gvili discloses each logic element is one or a combination of hardware (i.e. shooting lens, depth sensor, as well as a camera) and software (i.e. a depth map, depth measurement window, and scene segmentation) (pp. 568-569, section 3.2 depth key setting)

Regarding claim 21, Gvili discloses the image capture device is a video capture device (a novel depth video camera, page 564, line 4).

Regarding claim 22, Gvili discloses the depth logic is further configured to periodically provide a depth mask for a sequence of video frames captured by the video capture device (step f of the process for iteration of alpha values, page 570).

Regarding claim 23, Gvili discloses the image capture device setting is adjusted through one of a mechanical or electrical adjustment (depth key setting can be automatically set, page 568, third paragraph of section 3.2).

Regarding claim 24, Gvili discloses the image capture logic is further configured to adjust each pixel of image data of the scene (step d of the process shown the color distance calculation is performed for each pixel of the image data of the scene)( step d of the process for iteration of alpha values, page 570).

Regarding claim 25, this claim differs from claim 1 only in that the claim 9 is a method claim whereas claim 25 is an apparatus. Claim 25 further differs from claim 1 in that the limitations “a computing device” and “a display device” are additionally recited. Gvili teaches a computing device (a Pentium 3 machine, page 572, section 5) and a display (a video camera, page 564, line 4). Thus the apparatus claim 25 is analyzed and rejected as previously discussed with respect to claim 1 above

Regarding claim 26, Gvili discloses the computing device is a game console (game input device, page 572, section 5).

Regarding claim 27 and 28, these claims recite same limitations as claims 22 and 23, respectively. Thus they are analyzed and rejected as previously discussed with respect to claims 22 and 23 above.

Regarding claim 29, Gvili discloses the video capture device is a webcam (ZCam is used to generate depth keying during live broadcasts, page 568, line 5 and page 572, section 5).

Regarding claims 30 and 32, these claims recite same limitations as claim 11. Thus they are analyzed and rejected as previously discussed with respect to claim 11 above.

Regarding claim 31, Gvili discloses the scene image data includes an image of a person, the image of the person being incorporated into a video game for interaction therein (camera using depth-sensing technology are used in man-machine interactions) ( second paragraph of Summary, page 572).

6. Claim 2 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Gvili in view of Parker, and further in view of Tuomi, US 7,061,507.

Regarding claim 2, note the discussion of claim 1 above. Gvili and Parker do not teach storing the depth mask in memory of the image capture device. However, Tuomi teaches storing the depth mask in memory of the image capture device (provided a Z-buffer 1902 for storing the Z-values relating to the depth of the pixel; see col. 12, lines, 15-36, Tuomi).

It would have been obvious to one of ordinary skill in the art at the time this invention was made to have used a memory as taught by Tuomi as modified by Gvili and Parker so that it provide multiple buffers for storing information (col. 12, lines 15-17, Tuomi).

### ***Conclusion***

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7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Kopec et al. (US 5,706,364), Berman et al. (US 6,134,346), Long (US 7,161,634), Okada et al. (US 7,283,679), and Chen (US 6,556,704).

***Inquiries***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kent Wang whose telephone number is 571-270-1703. The examiner can normally be reached on 8:00 A.M. - 5:30 PM (every other Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ngoc Yen Vu can be reached on 571-272-7320. The fax phone number for the organization where this application or proceeding is assigned is 571-270-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://portal.uspto.gov/external/portal/pair>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KW  
5 March 2008

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/Timothy J Henn/

Examiner, Art Unit 2622